BUREAU OF WATER

South Carolina Department of Health and Environmental Control

SHELLFISH MANAGEMENT AREA 09B

2006 ANNUAL UPDATE

Shellfish Sanitation Program

Water Monitoring, Assessment and Protection Division
Environmental Quality Control - Bureau of Water
2600 Bull Street
Columbia, South Carolina 29201

July 2006

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South Carolina Department of Health and Environmental Control

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2006 ANNUAL UPDATE

[Data Thru December 2005]

Shellfish Management Area 09B
Shellfish Sanitation Program

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South Carolina Department of Health and Environmental Control

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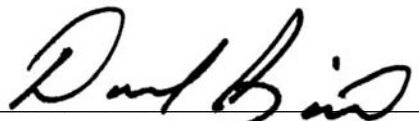

David G. Baize, Division Director
Water Monitoring, Assessment, and Protection Division
Environmental Quality Control - Bureau of Water

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ANNUAL UPDATE
Shellfish Management Area 09B
SCDHEC EQC Bureau of Water

Data Inclusive Dates:
01 / 01 / 03 thru 12 / 31 / 05

Classification Change:
X Yes ___ No

Shoreline Survey Completed: Yes

(I)ncreased/(D)ecreased/(N)one:
I Approved
N Cond. Approved
D Restricted
N Prohibited

Prior Report & Date: Annual -2005

SUMMARY

Based on reviews of fecal coliform bacteriological data and a pollution source survey, Shellfish Management Area 09B is impacted by one primary pollution source. Nonpoint source runoff appears to be the major source of fecal coliform bacteria concentrations throughout the area. Development within the management area continues at a rapid pace. Impervious surfaces typically result in increased volumes of stormwater runoff and a more rapid movement of stormwater into adjacent shellfish harvesting waters. Additionally, a substantial portion of the Francis Marion National Forest drains to Area 09B. Rainfall can generate stormwater runoff, which often results in elevated fecal coliform levels.

Based upon the current pollution source survey and bacteriological data, Nowell Creek (Station 09B-01), Foster Creek (Station 09B-19), and portions of the Wando River will be reclassified as Approved. However, although water quality in portions of Area 09B indicates a slight improvement for the current three-year review period, development along the adjacent upland shores and resulting decrease in permeable surface area are likely to continue to influence the classification within the upper reaches of the management area.

INTRODUCTION

PURPOSE AND SCOPE

The authority to regulate the harvest, sanitation, processing and handling of shellfish is granted to the South Carolina Department of Health and Environmental Control by Section 44-1-140 of the Code of Laws of South Carolina, 1976, as amended. The Department promulgated Regulation 61-47, which provides the rules used to implement this authority and outlines the requirements applied in regulating shellfish sanitation in the State. This regulation specifically addresses classification of shellfish harvesting areas and requires that all areas be examined by sanitary and bacteriological surveys and classified into an appropriate shellfish harvesting classification.

The United States Food and Drug Administration (USFDA) uses The National Shellfish Sanitation Program's (NSSP) *Guide for the Control of Molluscan Shellfish* to evaluate state shellfish sanitation programs. The NSSP Model Ordinance requires that a sanitary survey be in place for each growing area prior to its use as a source of shellfish for human consumption and prior to the area's classification as Approved, Conditionally Approved, Restricted or Conditionally Restricted. Each sanitary survey shall be updated on an annual basis and accurately reflect changes which have occurred within the area. Requirement of the annual reevaluation include, at a minimum, field observations of pollution sources, an analysis of water quality data consisting of the past year's data in combination with appropriate previously collected data, review of reports and effluent samples from pollution sources, and review of performance standards for discharges impacting the growing area. A brief report documenting the findings shall also be provided.

The following criteria consistent with the NSSP Model Ordinance and S. C. Regulation 61-47 are used in establishing shellfish harvesting classifications:

Approved - Growing areas shall be classified Approved when the sanitary survey concludes that fecal material, pathogenic microorganisms, and poisonous or deleterious substances are not present in concentrations which would render shellfish unsafe for human consumption. The Approved area classification shall be designated based upon a sanitary survey, which includes water samples collected from stations in the designated area adjacent to actual or potential sources of pollution. For waters sampled under adverse pollution conditions, the median fecal coliform Most Probable Number (MPN) or the geometric mean MPN shall not exceed fourteen per one hundred milliliters, and not more than ten percent of the samples shall exceed a fecal coliform MPN of forty-three per one hundred milliliters (per five tube decimal dilution). For waters sampled under a systematic random sampling plan, the geometric mean fecal coliform Most Probable Number (MPN) shall not exceed fourteen per one hundred milliliters, and the estimated ninetieth percentile shall not exceed an MPN of forty three (per five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP Guidelines.

Conditionally Approved - Growing areas may be classified Conditionally Approved when they are subject to temporary conditions of actual or potential pollution. When such events are predictable, as in the malfunction of wastewater treatment facilities, non-point source pollution from rainfall runoff, discharge of a major river, or potential discharges from dock or harbor facilities that may affect water quality, a management plan describing conditions under which harvesting will be allowed shall be adopted by the Department prior to classifying an area as Conditionally Approved. Where appropriate, the management plan for each Conditionally Approved area shall include performance standards for sources of controllable pollution (e.g., wastewater treatment and collection systems and an evaluation of each source of pollution) and means of rapidly closing and subsequent reopening areas to shellfish harvesting. Memorandums of agreements shall be a part of these management plans where appropriate.

Restricted - Growing areas shall be classified Restricted when sanitary survey data show a limited degree of pollution or the presence of deleterious or poisonous substances to a degree which may cause the water quality to fluctuate unpredictably or at such a frequency that a

Conditionally Approved classification is not feasible. Shellfish may be harvested from areas classified as Restricted only for the purposes of relaying or depuration and only by special permit issued by the Department and under Department supervision. For Restricted areas to be utilized as a source of shellstock for depuration, or as source water for depuration, the fecal coliform geometric mean MPN of restricted waters sampled under adverse pollution conditions shall not exceed eighty-eight per one hundred milliliters and not more than ten percent of the samples shall exceed a MPN of two hundred and sixty per one hundred milliliters for a five tube decimal dilution test. For waters sampled under a systematic random sampling plan, the fecal coliform geometric mean MPN shall not exceed eighty-eight per one hundred milliliters and the estimated ninetieth percentile shall not exceed an MPN of two hundred and sixty (five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP guidelines.

Conditionally Restricted - Growing areas may be classified Conditionally Restricted when they are subject to temporary conditions of actual or potential pollution. When such events are predictable, as in the malfunction of wastewater treatment facilities, non-point source pollution from rainfall runoff, discharge of a major river, or potential discharges from dock or harbor facilities that may affect water quality, a management plan describing conditions under which harvesting will be allowed shall be prepared by the Department prior to classifying an area as Conditionally Restricted. Where appropriate, the management plan for each Conditionally Restricted area shall include performance standards for sources of controllable pollution (e.g., wastewater treatment and collection systems and an evaluation of each source of pollution) and description of the means of rapidly closing and subsequent reopening areas to shellfish harvesting. Memorandums of agreements shall be a part of these management plans where appropriate. Shellfish may be harvested from areas classified as Conditionally Restricted only for the purposes of relaying or depuration and only by permit issued by the Department and under Department supervision. For Conditionally Restricted areas to be utilized as a source of shellstock for depuration, the fecal coliform geometric mean MPN of Conditionally Restricted waters sampled under adverse pollution conditions shall not exceed eighty-eight per one hundred milliliters and not more than ten percent of the samples shall exceed a MPN of two hundred and sixty per one hundred milliliters for a five tube decimal dilution test. For waters sampled under a systematic random sampling plan, the fecal coliform geometric mean MPN shall not exceed eighty-eight per one hundred milliliters and the estimated ninetieth percentile shall not exceed an MPN of two hundred and sixty (five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP guidelines.

Prohibited - Growing areas are classified Prohibited if there is no current sanitary survey or if the sanitary survey or monitoring data show unsafe levels of fecal material, pathogenic microorganisms, or poisonous or deleterious substances in the growing area or indicate that such substances could potentially reach quantities which could render shellfish unfit or unsafe for human consumption.

BACKGROUND INFORMATION

This sanitary survey evaluates the current harvesting classification of shellfish growing waters designated as Shellfish Management Area 09B (Area 09B). Area 09B consists of approximately 17,105 acres of shellfish growing area habitat located in Berkeley and Charleston Counties, South Carolina. Area 09B extends from the headwaters of the Wando River, located within the Francis Marion National Forest at Ion Swamp, 19 miles southwest to the Wando River's confluence with the Cooper River. Area 09B consists entirely of the Wando River and all of its tributaries, including Alston, Boone Hall, Darrell, Deep, Foster, Guerin, Hobcaw, Horlbeck, Nowell, Toomer and Wagner Creeks.

The harvesting classifications of Area 09B prior to this sanitary survey were as follows:

Prohibited: (Administrative closure)

1. Seaward portions of the Wando River (and adjacent tributaries and marshland), from Remley's Point to Station 15, including all of Hobcaw and Molasses Creek;
2. Southern portions of Beresford Creek adjacent to the Cooper River and Area 10B;
3. The Wando River, within approximately 1000 feet Detyen's Shipyard;
4. The Wando River, within approximately 1000 feet of Detyen's Shipyard NPDES discharge outfall.
5. The Wando River within approximately 200 feet of the Halsey Cannon Boatyard.

Restricted:

1. That area of the Wando River from Station 15, extending to Station 2, at the confluence of Horlbeck Creek with the Wando River. This including all of Rat Hall, Nowell, Foster and Beresford Creek and their tributaries.
2. All of Horlbeck Creek, Boone Hall Creek and their tributaries from their headwaters to Station 02 in the Wando River.
3. The Wando River from Station 17 to its headwaters. This includes the tributaries of Guerin, Alston, Darrell, Wagner, Deep, and Toomer creeks.

Approved:

The Wando River from the northern part of its confluence of Horlbeck Creek (near Station 02) to Station 17, excluding Prohibited closure areas.

The shellfish industry in South Carolina is based primarily on the harvest of the eastern oyster (*Crassostrea virginica*) and hard clams, which include both the northern clam (*Mercenaria mercenaria*) and several small populations of the southern clam (*Mercenaria campechiensis*). Areas in South Carolina designated for commercial harvest by the South Carolina Department of Natural Resources (SCDNR) include State shellfish grounds, culture permits and Kings Grant areas. The ribbed mussel (*Geukensia demissa*) is also harvested in South Carolina. It is primarily gathered on a small scale by the general public for recreational harvest. The South Carolina Department of Health and Environmental Control will disallow the harvesting of shellfish within Area 09B, for direct marketing purposes, from the restricted waters listed below in the Recommendations.

There are two State Shellfish Grounds (S) located within Area 09B: S-237 and S-238. The shellfish harvesting season in South Carolina normally extends from mid-September through mid-May. The South Carolina Department of Natural Resources (SCDNR) has the authority to

alter the shellfish harvesting season for resource management purposes and grant permits for year-round mariculture operations. Additionally, the South Carolina Department of Health and Environmental Control has the authority to prohibit shellfish harvesting when necessary to ensure that shellfish harvested in South Carolina waters are safe for human consumption.

POLLUTION SOURCE SURVEY

CHANGES IN POLLUTION SOURCES

No substantial changes in pollution sources have occurred in Area 09B subsequent to the 2005 Annual Update.

SURVEY PROCEDURES

Shoreline surveys of Area 09B were conducted by the Region 7 Shellfish Sanitation staff, by watercraft, vehicle and on foot, during the survey period and are ongoing. Extensive visual examinations of lands adjacent to the waters of Area 09B were conducted to determine potential sources of pollution entering shellfish growing waters.

POINT SOURCE POLLUTION

National Pollutant Discharge Elimination System (NPDES) Permitted Facilities		
PERMIT NUMBER	**FACILITY NAME**	**FACILITY TYPE**
SC0033022	Detyens Shipyards/Wando Yard	Industrial-Discharge
SC0043273	Mt. Pleasant WW/WTR TTMT	Municipal-Discharge
SCG250160	Cooper Hall Retirement	Industrial-Discharge (Inactive)
SCG730086	French Quarter Group L.P Mine	Industrial-Discharge

A. **Municipal and Community Waste Treatment Facilities** - There is one permitted wastewater facility that has an outfall within Area 09B. Detyens Shipyards, Inc. operates a sewage waste treatment system located on their property adjacent to the Wando River and Highway 41. The plant receives wastewater generated onsite and from a convenience store located across Highway 41. The treated effluent discharges into the Wando River adjacent to the shipyard. Detyens had no fecal violations in 2004.

B. **Industrial Waste (Discharges) -** The Mount Pleasant Waterworks operates a water treatment plant within the area. The facility discharges into Area 09B, however, the effluent has no fecal coliform component. Refer to the Potential Pollution Sources map included in this report. There is one permitted industrial discharge located within the

boundaries of Area 09B. The French Quarter Group operates a borrow pit located along the northern portion of the area, adjacent to Highway 41. The permit was issued for de-watering activities that may be necessary during normal operations. There is a second facility located within the area, however, the discharge is to a creek that empties into Area 10B. The Cooper Hall Retirement facility, located in Mount Pleasant, was inactivated in 2004. The facility discharged excess water from their HVAC system. The effluent, which is primarily condensate, drained to Shem Creek and eventually into Charleston Harbor.

C. **Marinas** - S.C. Regulation 61-47, Shellfish defines *Marina* as "any water area with a structure (docks, basin, floating docks, etc.), which is: 1) used for docking or otherwise mooring vessels; and, 2) constructed to provide temporary or permanent docking space for more than ten boats, or has more than 200 linear feet of docking space." Area 09B supports a wide variety of boating facilities. Hobcaw View Marina, located on Hobcaw Creek, provides dockage for approximately 25 boats and allows for another 10 moorings within the creek. No fueling or pump out facilities are provided. Two marine repair facilities are located on the Wando River. Detyens Shipyard is located on the south side of the Wando River, northwest of the S. C. Highway 41 Bridge, near Cainhoy. Detyens has three large dry docks and serves as a vessel repair facility.

Halsey Cannon Boatyard, located across the river from Detyens and adjacent to S.C. Highway S-8-26, provides repairs to recreational boats ranging in size from 15 to 30 feet. This closure zone was established based upon a sizing determination conducted by the Bureau of Water's Division of Water Quality, 401 Certification section. Additionally, the S.C. Ports Authority operates the Wando Terminal located on the eastern shore of the Wando River approximately three miles from the Wando and Cooper River confluence. The terminal loads/unloads intercontinental transport cargo vessels on a weekly basis. There are no commercial fisheries docks within Area 09B. Closure zones exist around all marinas within the area.

D. **Radionuclides** - Sources of radionuclides have not been identified within Area 09B, and radionuclide monitoring has not been conducted. No other sources of poisonous or deleterious substances have been identified within the area.

NONPOINT SOURCE POLLUTION

A. **Urban and Suburban Stormwater Runoff** - A shoreline survey conducted in Area 09B revealed the highest concentration of homes to be along the Mount Pleasant side of the Wando River. Single family homes continue to be built along the south side of the Wando River between Guerin Creek and the Paradise Island Boat Landing. Multiple housing developments are being built from Station 8 up to Station 17. Residential subdivisions start at the Wando Terminal and continue northward along the Wando River.

New homes and/or docks are continually under construction in Alston, Boone Hall, Guerin, Nowell and Rat Hall Creeks. Stormwater runoff adversely impacts water quality by transporting fecal coliform bacteria from land to the shellfish growing area.

Stormwater permits may be used as an indicator of land disturbing activities. Approximately 201 stormwater permits have been issued within Charleston County in 2005. The majority of these permits are concentrated in the Mount Pleasant area and have been issued to construction sites and/or housing subdivisions. The remainder has been issued for stormwater control at schools, churches and small businesses. These areas are depicted on the attached Potential Pollution Source Map.

A dredge spoil area is located on the southern most portion of Daniel Island, located at the mouth of the Wando River. The Army Corps of Engineers conducted one dredging project in this area during 2005. The area between Charleston Harbor and the Wando Terminal was dredged. They also performed a dredge operation in Area 10B. Materials from both dredge operations were deposited in the Daniel Island Spoil area. The South Carolina State Ports Authority also conducts its own maintenance dredging directly in front of the Wando Terminal on an "as needed" basis.

The uplands surrounding the shellfish growing waters of Area 09B consist of various soil textures defined by the United States Department of Agriculture (USDA), Soil Conservation Service (Berkeley Co.1980 & Charleston Co.1971) utilizing general classifications and descriptions. Although lands within Area 09B, along the Berkeley County side of the river, consist of numerous soil types, the area is generally comprised of Chipley-Echaw-Pickney soils, made up of nearly level soils on long, narrow to broad ridges in areas roughly parallel with the coastline. The USDA (1980) further describes these soils as "Moderately well drained and very poorly drained soils that are sandy throughout." The upland area along the Charleston County side of the river consists of numerous soil types, the area is generally comprised of soils in the Yonges series. Soils of this series typically occur on a low, swamp-like plain and on islands of higher areas that separate and parallel major streams. The USDA (1971) further describes these soils as "Poorly drained to very poorly drained, level to nearly level soils that have a loamy to sandy surface layer and a loamy to clayey subsoil."

B. **Agricultural Runoff** - There are no permitted agricultural facilities located in Area 09B. The shoreline survey found a residence adjacent to Station 05 that has a pasture that occasionally contains two to four horses. The shoreline survey also revealed approximately eight cows one to two miles upstream from Station 06. Area 09B serves as a drainage basin for southwestern portions of the Francis Marion National Forest.

C. **Individual Sewage Treatment and Disposal Systems** - The Snowden Subdivision, located at the headwaters of Mount Pleasant's Foster Creek, has the only large concentrated area of individual septic systems within Area 09B. There are plans to build a new water distribution line and possibly city sewer to this area. The Boone Hall Recreation area, adjacent to Station 07, continues to use a septic system. Approximately five homes remain on septic tanks along Horlbeck Creek. Paradise Island has continued to increase the number of residences served by septic systems. There are multiple homes located north of Station 06 that are within the confines of the national forest that are also on individual septic systems. Each system requires inspection and approval by the Division of Environmental Health, Trident Health District, prior to final installation.

D. **Wildlife and Domestic Animals** - Area 09B supports a large population of domestic animals attributable to a number of private residences along the shores of the Wando River. The area supports a moderate amount of wildlife along the northern border that extends into the Francis Marion Forest. The area has many small tidal creeks. This creek system provides a possible conduit for animal fecal coliform bacteria to be transported to the adjacent growing waters.

E. **Boat Traffic** - Recreational boat traffic is moderate throughout the area between the months of November and April and heavy between the months of May and October. Commercial boat traffic ranges from fisherman collecting blue crabs to large commercial cargo vessels utilizing the S.C. Ports Authority Wando Terminal.

F. **Hydrographic and Habitat Modification** - Hydrographic and habitat modification in estuarine areas requires both State and Federal approval. Portions of the Wando River from the Charleston Harbor to the I-526 Bridge require regular maintenance dredging. The U.S. Army Corps of Engineers utilizes designated tracts of land adjacent to the Cooper River as dredge spoil sites.

G. **Marine Biotoxins** - Bivalve shellfish contamination from marine biotoxins has not been shown to be a human health concern within Area 09B. The Department participates in a State Task Force on Toxic Algae and maintains a Toxic Algae Emergency Response Team.

HYDROGRAPHIC AND METEOROLOGICAL CHARACTERISTICS

PHYSIOGRAPHY

Area 09B is comprised of the Wando River and associated deep-water tributaries and marshlands. The creeks within the area range from 30 to 450 feet in width and average 5 to 25 feet in depth. The shipping channel near the Wando Terminal is maintained at a mean low water depth between 37 and 40 feet by the U.S. Army Corps of Engineers. Freshwater flows into the area from the Francis Marion National Forest and associated creeks. High salinity ocean water enters the area from the Charleston Harbor. The entire management area is approximately eight miles wide (northwest to southeast) and nineteen miles long (southwest to northeast).

Tides - Tides in Area 09B are semidiurnal, consisting of two low and two high tides occurring each lunar day. Mean tidal ranges in the Wando River at the Highway 41 Bridge are 6.2 feet during normal tides and 8.0 feet during spring tides. Wind direction and intensity, as well as atmospheric pressure, typically cause variations in predicted tidal ranges.

Rainfall - Precipitation in Area 09B is heaviest during late summer and early autumn. Tropical storms and hurricanes occasionally produce extremely large amounts of rainfall. During winter months heavy rainfall events are uncommon, yet occasional intense thunderstorms associated with rapidly moving low-pressure systems generate heavy rains. Precipitation rarely occurs in the form of snow or ice. Spring weather patterns may be dynamic with associated thunderstorms and severe weather conditions.

The mean total annual rainfall for the thirty-year period 1971-2000, recorded at the Charleston International Airport, is 51.53 inches. The 2005 precipitation total recorded in Mount Pleasant was 67.45 inches.

Winds - Prevailing winds along the central portion of the South Carolina coast are from the south and west during spring and summer and from the north during autumn and winter. Wind speeds are generally less than 15 miles per hour (mph); however, strong weather systems may generate winds in excess of 25 mph. Tropical storms and hurricanes occur occasionally.

River Discharges - The Wando River receives freshwater from two primary sources. The first is freshwater flowing into the mouth of the Wando River from the Cooper River. The second is runoff from the Wando River watershed.

WATER QUALITY STUDIES

DESCRIPTION OF THE PROGRAM

The Department currently utilizes a systematic random sampling (SRS) strategy within Area 09B in lieu of sampling under adverse pollution conditions. In order to comply with NSSP guidelines, a minimum of thirty samples are required to be collected and analyzed from each station during the review period. Sampling dates are computer generated prior to the beginning of each quarterly period thereby insuring random selection with respect to tidal stage and weather. Day of week selection criteria is limited to Mondays, Tuesdays and Wednesdays due to shipping requirements and laboratory manpower constraints. Sample schedules are rarely altered.

During July 1998, an updated shellfish water quality data scheduling and collection procedure was formalized. Samples utilized for classification purposes are limited to those samples collected in accordance with the SRS for a 36-month period beginning January 1 and ending December 31. This allows for a maximum of 36 samples per station, yet provides a six-sample cushion (above the NSSP required 30 minimum) for broken sample bottles, lab error, breakdowns, etc. This also allows each annual report's water quality data to meet the requirements for the NSSP Triennial Review sampling criteria.

576 surface water quality samples (<1.0 ft. deep) were collected for bacteriological analyses and classification purposes from 16 active water quality sampling stations in Area 09B during the period 01/01/03 through 12/31/05. The samples were collected in 120 ml amber glass bottles, immediately placed on ice and transported to the South Carolina Department of Health and Environmental Control's Region 7 Environmental Quality Control laboratory at North Charleston, South Carolina. An additional 120 ml water sample was included with each shipment as a temperature control. At the laboratory, sample sets exceeding a 30-hour holding time or containing a temperature control in excess of 10 degrees C. were discarded (APHA, 1970).

Surface water temperatures were measured utilizing hand-held, laboratory-quality calibrated centigrade thermometers. Salinity measurements were measured in the laboratory using an automatic temperature compensated refractometer. Additional field data include ambient air temperature, wind direction, tidal stage and date and time of sampling. Tidal stages were determined by using Nautical Software's *Tides & Currents*, Version 2 (1996).

MONITORING RESULTS

Stations exceeding a fecal coliform geometric mean MPN value of 14 are 04, 05, 06, 07, 09, 10, and 12. No station exceeds a fecal coliform geometric mean MPN value of 88. The Stations that exceed a fecal coliform MPN estimated 90th percentile value of 43 are 04, 05, 06, 07, 09, 10, 11, 12, 15, and 18. No station exceeds a fecal coliform MPN estimated 90th percentile value of 260.

CONCLUSIONS

Based on review of fecal coliform bacteriological data and a pollution source survey, Area 09B is impacted by one primary source of actual or potential pollution. Nonpoint source runoff appears to be a major source of fecal coliform bacteria concentrations throughout the area. Development within the management area continues at a rapid pace.

RECOMMENDATIONS

The shoreline survey and bacteriological data review of Shellfish Management Area 09B indicate that current classification boundary descriptions should be modified. Water quality in portions of Area 09B indicates a slight improvement for the current three-year review period, however, development along the adjacent upland shores and a decrease in permeable surface area will likely continue to influence classification of the area's shellfish growing waters.

The Wando River, from an imaginary line drawn between Station 01 and Station 19, north to Station 17, excluding Prohibited closures associated with Detyen's Shipyard and Halsey Cannon boatyard, is recommended for an Approved classification. This will also include Nowell Creek and Foster Creek and their adjacent marshes. A new water quality monitoring station (09B-21) will be added in Horlbeck Creek to monitor fecal coliform levels and help define classification boundaries in that area.

The following harvesting classification of Area 09B is recommended:

Prohibited: (Administrative closure)

1. Seaward portions of the Wando River (and adjacent tributaries and marshland), from Remley's Point to Station 15, including all of Hobcaw and Molasses Creek;
2. Southwester portions of Beresford Creek and adjacent marsh near Thomas Island, extending to the Area 10B boundary;
3. The Wando River, within approximately 1000 feet Detyen's Shipyard;

4. The Wando River, within approximately 1000 feet of Detyen's Shipyard NPDES discharge outfall.
5. The Wando River within approximately 200 feet of the Halsey Cannon Boatyard.

Restricted:

1. That portion of the Wando River from the Prohibited boundary at Station 15 to an imaginary line drawn from Station 01 to Station 19. This closure will include all of Rat Hall Creek and Ralston Creek and their tributaries.
2. All of Horlbeck Creek, Boone Hall Creek and their tributaries from their headwaters to Station 02 in the Wando River.
3. The Wando River from Station 17 to its headwaters. This includes the tributaries of Guerin, Alston, Darrell, Wagner, Deep, and Toomer creeks.

Approved:

1. Portions of the Wando River, north of an imaginary line drawn between Station 01 and Station 19, extending to Station 17, excluding Prohibited closure areas;
2. All of Martin Creek and Hopewell Creek;
3. Portions of Beresford Creek, from the Wando River to the Prohibited area near Thomas Island;
4. Portions of Nowell Creek from Hopewell Creek to Station 01.

Station Additions/Deactivations/Modifications:

Deactivation: Station 09B-06, Wando River at Paradise Boat Landing, and Station 09B-10, Wando River at Alston Creek confluence, will be deactivated. Due to consistently elevated fecal coliform levels associated with freshwater inflow, and the likelihood that classification changes will not occur, continued sampling of these stations is unnecessary. Sample Stations 09B-04 and 09B-05 will continue to be monitored.

Additions: A new station**,** 09B-21 (Lat/Lon 32.8745856, -79.830743), Horlbeck Creek at power line crossing, will be created. This area has substantial shellfish resources and the addition of this station may serve to more accurately delineate classification boundaries.

Analysis of sampling data for Area 09B demonstrates the probability of a significant impact from rainfall exceeding 4.00" in a 24-hour period. Therefore, a precautionary closure of Area 09B will be implemented following rainfall events of greater than 4.00" in a 24-hour period, as measured at the Mount Pleasant Waterworks, Rifle Range Road facility located in Mount Pleasant. This methodology is associated with the concept of the Probable Maximum Precipitation (PMP). The National Weather Service publishes PMP estimates for the coastal United States in a series of hydro-meteorological reports (HMRs) (*National Weather Service*). PMP estimates for South Carolina's growing areas are derived from HMRs 51, 52 and 53 (*National Research Council, 1985*).

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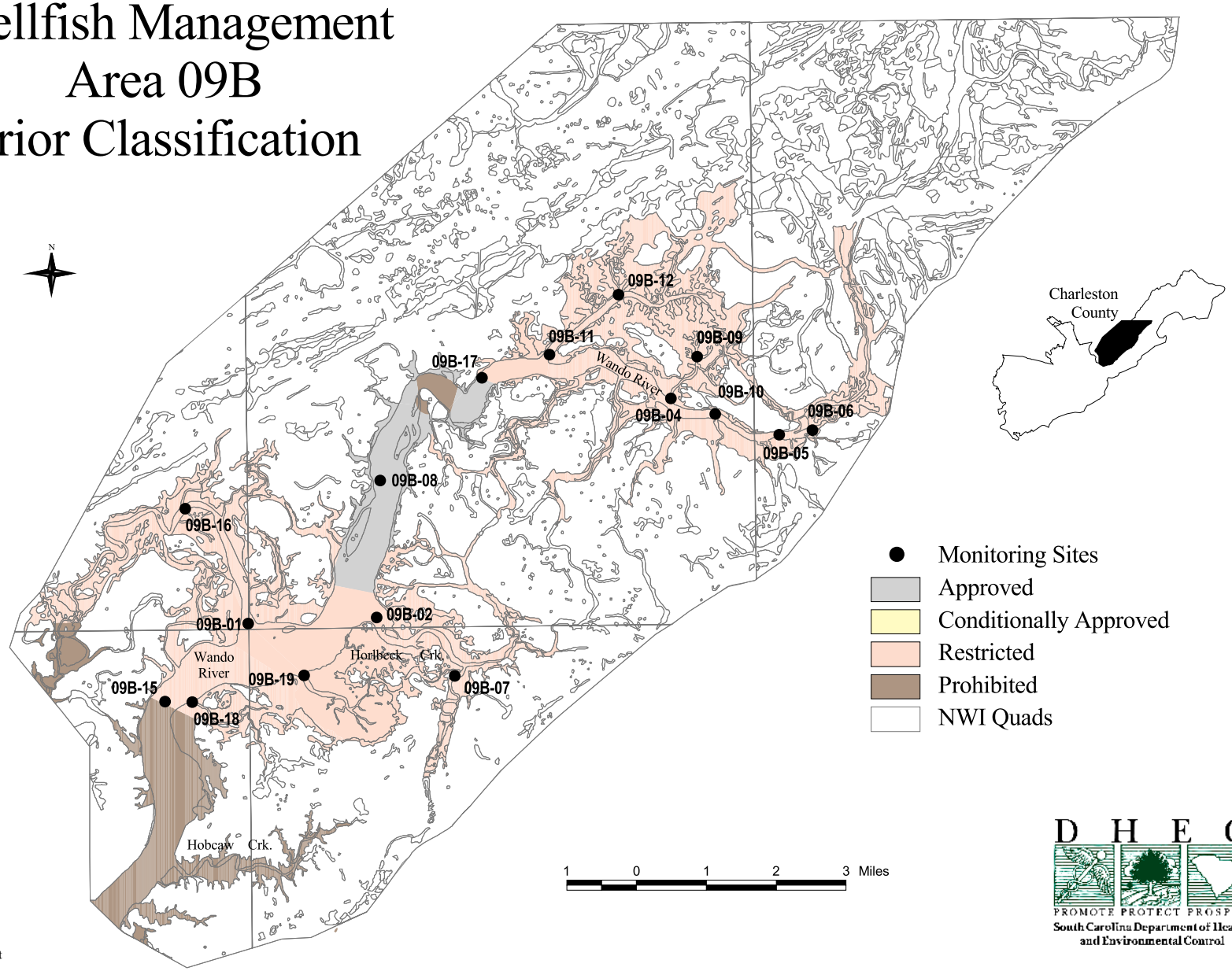
TABLE #1
Shellfish Management Area 09B
Water Quality Sampling Stations Description

Station	Description
01	Wando River at Nowell Creek
02	Wando River at Horlbeck Creek
04	Wando River at Deep Creek
05	Wando River opposite Big Paradise Island
06	Wando River at Paradise Boat Landing (**Deactivate 1/1/07)**
07	Boone Hall Creek opposite County Recreation Area
08	Wando River at Marker #29
09	Deep Creek - 1 mile from confluence with Wando River
10	Wando River at Alston Creek confluence (**Deactivate 1/1/07)**
11	Wando River at Guerin Creek
12	Guerin Creek at Old House Creek
15	New bridge- Route I-526
16	Confluence of Martin Creek and Nowell Creek
17	Wando River midway between Stations 3 and 11 (at old dry dock)
18	Rat Hall Creek at confluence with Wando River
19	Foster Creek at confluence with Wando River
21	Horlbeck Creek at the power line crossing (**New 1/1/07)**

(Total 15)

Figure 1.

Shellfish Management Area 09B Prior Classification



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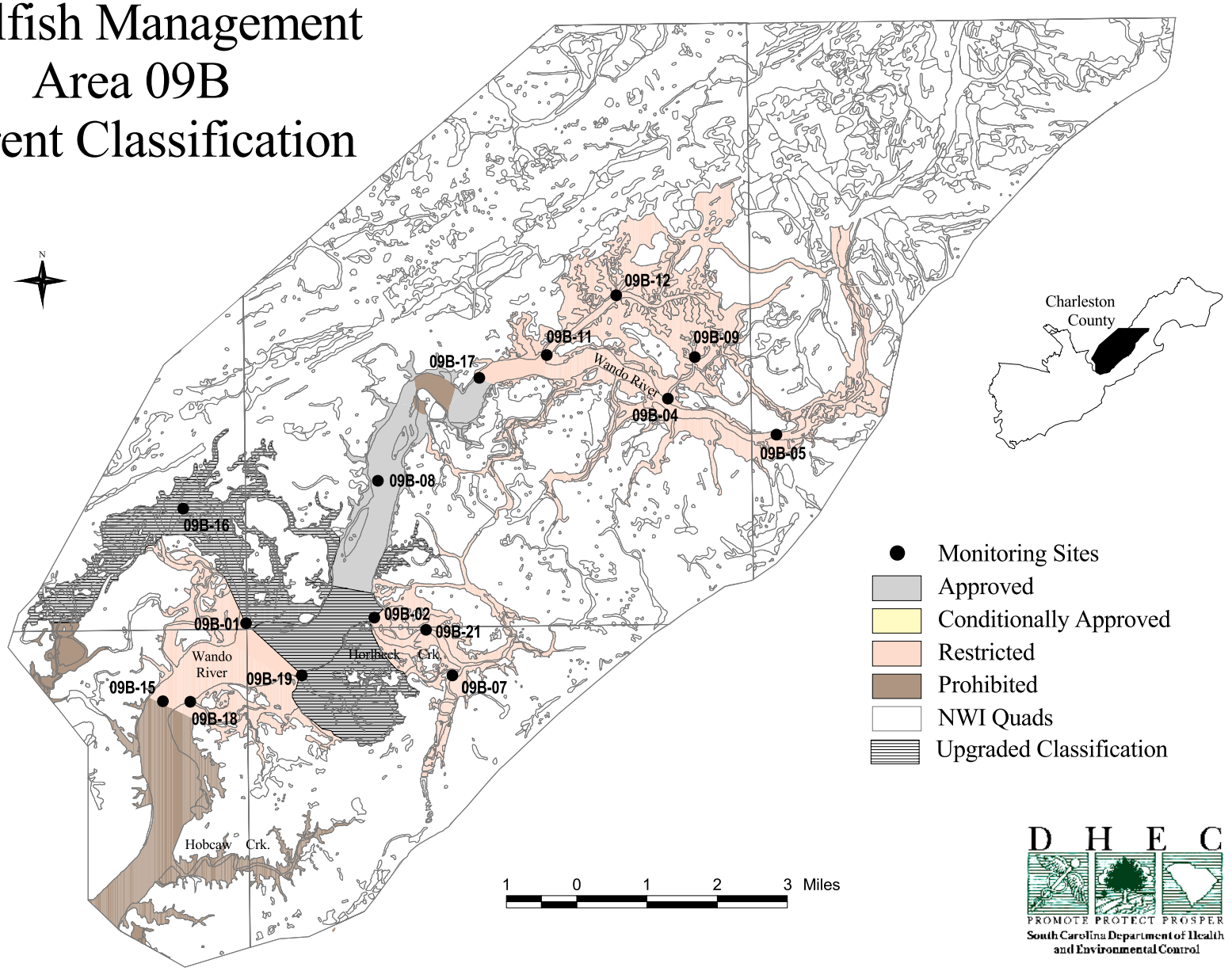
2006 Annual Report

Figure 2.

Shellfish Management Area 09B Current Classification



D H E C

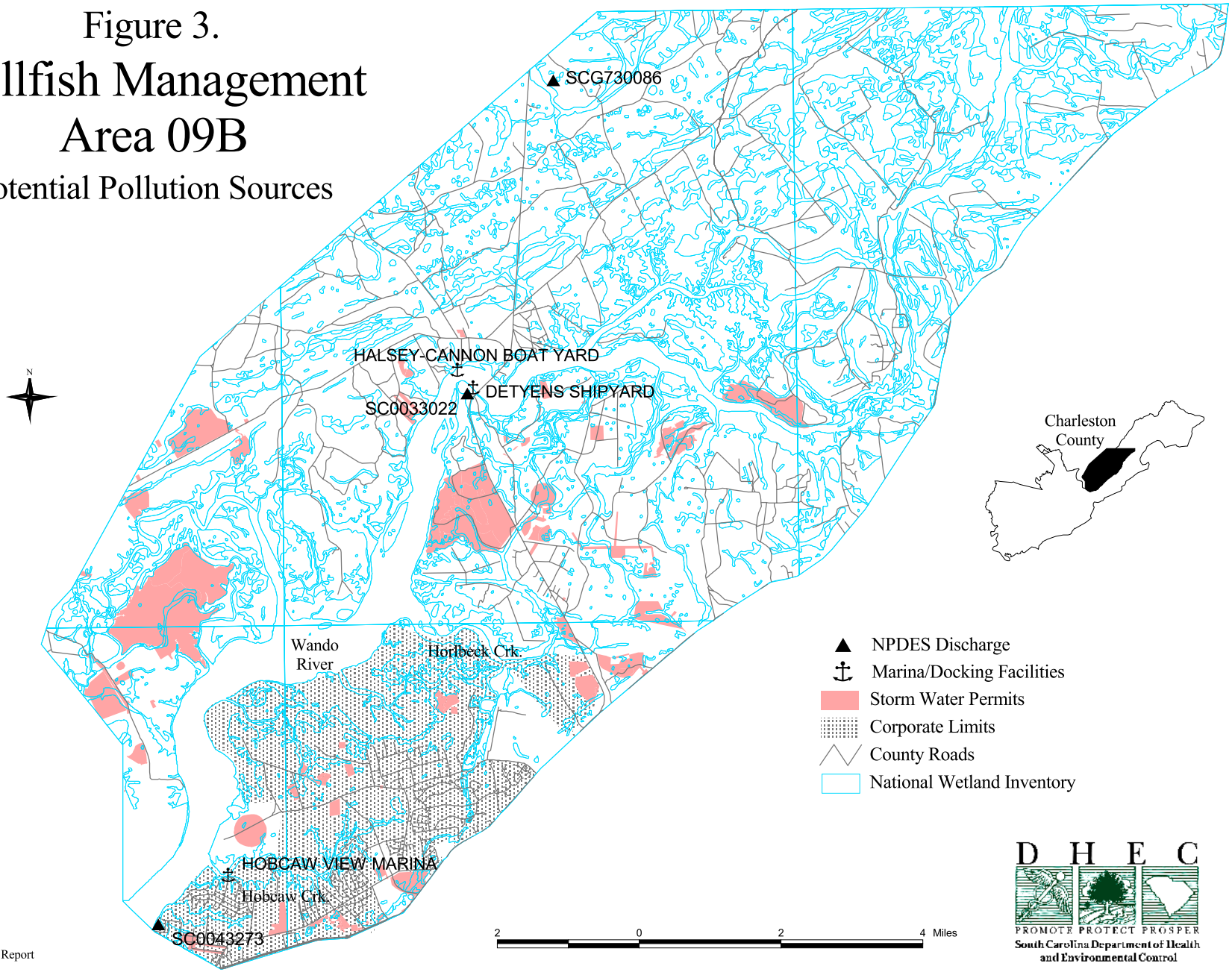
PROMOTE PROTECT PROSPER

South Carolina Department of Health and Environmental Control

Figure 3.

Shellfish Management Area 09B

Potential Pollution Sources



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South Carolina Department of Health and Environmental Control

2006 Annual Report

TABLE #2
Shellfish Management Area 09B

FECAL COLIFORM BACTERIOLOGICAL DATA SUMMARY
from Shellfish Water Quality Sampling Stations between

January 1, 2003 and December 31, 2005

Station #	1	2	4	5	6	7	8	9	10	11
SAMPLES	36	36	36	36	36	36	36	36	36	36
GEOMEAN	5.4	6.7	16.5	18.4	25.5	19.3	4.4	27.1	20.7	8.8
90TH %ILE	19	32	86	70	112	103	14	232	140	50
WATER QLTY	A	A	R	R	R	R	A	R	R	R
CLASSIFICATION	R	R	R	R	R	R	A	R	R	R

Station #	12	15	16	17	18	19				
SAMPLES	36	36	36	36	36	36				
GEOMEAN	18.8	7.9	8.0	7.1	13.2	8.7				
90TH %ILE	136	47	31	24	64	41				
WATER QLTY	R	R	A	A	R	A				
CLASSIFICATION	R	P	A	R	R	R				

Station #										
SAMPLES										
GEOMEAN										
90TH %ILE										
WATER QLTY										
CLASSIFICATION										

A - Approved **CA** - Conditionally Approved **R** - Restricted
RND - Restricted/No Depuration **P** - Prohibited

TABLE #3

WATER QUALITY
SAMPLING STATIONS DATA

Shellfish Management Area 09B

Detailed data for each shellfish monitoring station listed in this report's "Fecal Coliform Bacteriological Data Summary Table" and in other shellfish reports, can be obtained by writing South Carolina's Department of Health and Environmental Control – Freedom of Information office at the address below.

Freedom of Information
SC Dept. of Health & Envir. Control
2600 Bull Street
Columbia, SC 29201

Any explanation or clarity needed on the report's content can be obtained by contacting the preparer(s), and/or reviewer(s) listed on the cover page.

TABLE #4

RAINFALL DATA

Shellfish Management Area 09B

SOURCE:
Mount Pleasant Waterworks and Sewer Commission

AREA 9B ANNUAL TABLE OF DAILY RAINFALL DATA

SOURCE: Mt. Pleasant Waterworks and Sewer Commission

Mt. Pleasant, SC (Rifle Range Road rainfall recording station)

2003	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1st	1.00		0.50									
2nd					0.20		0.40		0.50			
3rd							0.50					
4th			0.10			0.60			0.10			0.50
5th						0.10		**0.50**				1.10
6th			1.00						4.80			
7th		0.70	0.50		1.10	0.30		1.00	1.60			
8th				1.00		0.70			0.20	**0.50**		
9th				2.70		0.20			0.40			
10th		**0.20**		0.50								
11th		0.20		0.10								0.90
12th												
13th			0.30									
14th			0.60				1.60					0.50
15th			0.20			0.20	1.50					0.20
16th					0.70							
17th		0.90	1.30		0.30							
18th					0.40		0.10				0.30	
19th					1.20	0.40	0.30	1.30			**0.20**	
20th			1.70				0.90					
21st												
22th	0.50			0.10								
23rd	0.30	0.70			2.80		**0.40**		0.20			
24th							1.90					
25th												
26th				1.90			1.60					
27th		0.60		0.20			0.30					
28th		0.30			0.50		0.10			0.50	0.00	
29th						0.50	0.90			1.80		
30th												
31st												

(Monthly Figures) **Year's Rainfall Total:** **55.90**

SUM	1.80	3.60	6.20	6.50	7.20	3.00	10.50	2.80	7.80	2.80	0.50	3.20
MAX	1.00	0.90	1.70	2.70	2.80	0.70	1.90	1.30	4.80	1.80	0.30	1.10
MIN	0.30	0.20	0.10	0.10	0.20	0.10	0.10	0.50	0.10	0.50	0.00	0.20
AVG	0.60	0.51	0.69	0.93	0.90	0.38	0.81	0.93	1.11	0.93	0.17	0.64

"ND"/"--" = no data (Shaded/bold entries are the dates shellfish water samples were taken.) 8,9a,9b

AREA 9B ANNUAL TABLE OF DAILY RAINFALL DATA

SOURCE: Mt. Pleasant Waterworks and Sewer Commission

Mt. Pleasant, SC (Rifle Range Road rainfall recording station)

2004	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1st					1.30		0.30					
2nd		**1.50**			1.00		0.50			1.60		
3rd		0.30			0.30							
4th												
5th									0.50			
6th									1.70			
7th									0.40			
8th				0.30					0.30			0.10
9th										0.60		
10th	0.20											0.40
11th	0.50	0.70		1.10			0.20		0.20			
12th		0.10		0.10				2.50	0.10		0.10	
13th		0.10		0.10				3.50	1.00			
14th		0.30						1.50		0.40		
15th			**0.30**			0.10		0.60		0.50		
16th		0.30				0.20						
17th					**0.50**	0.50		0.30				
18th							0.10					
19th						0.40	0.80					
20th												
21st												
22th								0.30				
23rd												
24th											0.10	
25th								0.10				1.00
26th		0.70						0.30	3.50			0.20
27th	0.70					0.40		1.30	0.50		1.00	
28th							3.10	4.00				
29th							0.20	4.00				
30th			0.10	1.60		0.70		0.10	0.50			
31st												

(Monthly Figures) **Year's Rainfall Total:** **52.80**

SUM	1.40	4.00	0.40	3.20	3.10	2.30	5.20	18.50	8.70	3.10	1.20	1.70
MAX	0.70	1.50	0.30	1.60	1.30	0.70	3.10	4.00	3.50	1.60	1.00	1.00
MIN	0.20	0.10	0.10	0.10	0.30	0.10	0.10	0.10	0.10	0.40	0.10	0.10
AVG	0.47	0.50	0.20	0.64	0.78	0.38	0.74	1.54	0.87	0.78	0.40	0.43

"ND"/"--" = no data (Shaded/bold entries are the dates shellfish water samples were taken.) 8,9a,9b

AREA 9B ANNUAL TABLE OF DAILY RAINFALL DATA

SOURCE: Mt. Pleasant Waterworks and Sewer Commission

Mt. Pleasant, SC (Rifle Range Road rainfall recording station)

2005	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1st				1.50		0.50	0.70	0.10		0.50		
2nd		0.10		0.10								
3rd		0.70				0.40	0.40					
4th					**0.30**					0.40		0.30
5th					1.10	0.50		0.20		2.00		1.00
6th								2.00	0.50	3.00		
7th			0.50	0.20						0.70		
8th							0.30	1.30				1.00
9th		0.50					0.40	0.40		0.50		
10th							0.20					
11th								0.70		0.20		
12th	0.30			0.20				0.40				
13th	0.50			0.20			0.10		0.20			
14th	0.10											
15th			0.50					0.50				0.20
16th			1.20									
17th			0.10		0.70			2.50				1.00
18th					1.50							
19th						0.40						
20th					2.00						6.00	
21st		0.70										
22th			3.00	0.10				1.00				
23rd		0.20				0.40		0.50		1.00		
24th		0.10				0.10		0.50	0.50	0.50		0.10
25th			0.10			1.20		0.50				
26th			0.50					0.50				
27th		1.30	2.50			0.20		0.70	1.50	0.10	0.20	
28th					0.20	0.40			1.25		0.50	0.10
29th					1.50	0.30	0.30				0.70	
30th	0.60				0.30			0.10				
31st					1.20		0.20					

(Monthly Figures) **Year's Rainfall Total:** **67.45**

SUM	1.50	3.60	8.40	2.30	8.80	4.40	2.60	11.90	3.95	8.90	7.40	3.70
MAX	0.60	1.30	3.00	1.50	2.00	1.20	0.70	2.50	1.50	3.00	6.00	1.00
MIN	0.10	0.10	0.10	0.10	0.20	0.10	0.10	0.10	0.20	0.10	0.20	0.10
AVG	0.38	0.51	1.05	0.38	0.98	0.44	0.33	0.74	0.79	0.89	1.85	0.53

"ND"/"--" = no data (Shaded/bold entries are the dates shellfish water samples were taken.) 8,9a,9b